HCAL Simulation Meeting

27-Sep-2000 9:00-18:00

9:00-10:45
- News S.Kunori
- New HF shower library V.Kolossov
- Status of ORCA and Ntuple maker S.Abdullin

- Update on L1 S.Dasu
- Low Et Jets A.Krokhotine
- Reconstruction of 20 GeV hard jets for case of high luminosity I.Vardanyan
- cmsim/cmsjet/tdr comparision on pion resolutions S.Abdullin/S.Nikitenko

10:45-11:00 Coffee break

11:00-12:00
- Discussion on EE layout D.Crockeril, J.Freeman & others

13:30-17:00
(Joint session with the Physics Group/40-R-C10)

- Jet energy correction S.Arcelli
- Missing Et performance P.Hidas/S.Abdullin

HCAL/PHYS. Simulation

*** Preliminary Physics group's agenda ***
Dear Colleagues,
the next phys./det.simulation meeting will be held during the CMS week, on Wednesday Sept. 27th in 40-R-C10 starting at 14.00 till 17.00 and continuing for heavy ions from 17.00 till 19.h
Very preliminary agenda:
- Higgs production in Pomeron-Pomeron interactions, V. Khoze
- A/H to tau-tau to hadrons with full reconstruction,
  1st level trig. eff with dedicated tau trigger A. Nikitenko
- qqH with H to tau-tau to l+h, full reconstruction, A. Nikitenko
- progress on A/H/charged H to neutralinos/charginos, F. Moortgat
- progress on Higgs to bb, V. Drollinger
- progress on WH production with CompHEP, Ph. Mine
- observability of BESS model vector bosons in CMS, M. Spezziga
- trigger/selection cuts for B-physics channels, Y. Lemoigne
- trigger/selection cuts for Higgs and SUSY channels, D. Denegri
  heavy ion topics:
- progress on muon reconstruction, O. Kodolova
- jet reconstruction with full detector simulation

News(1)

Software

- **CMGEN:** Pythia6 / CompHep interface
- **CMSIM/ORCA4/Ntuples** (see the following slides)
- **GEANT4/OSCAR:** Test hadron shower with test beam data ←

HELP!

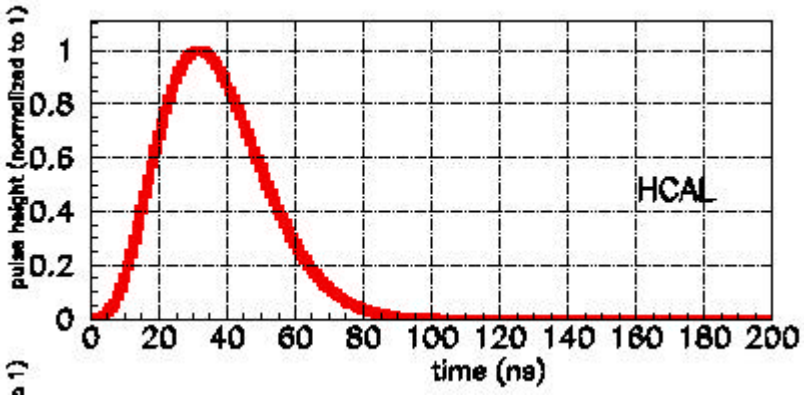
Trigger Studies:

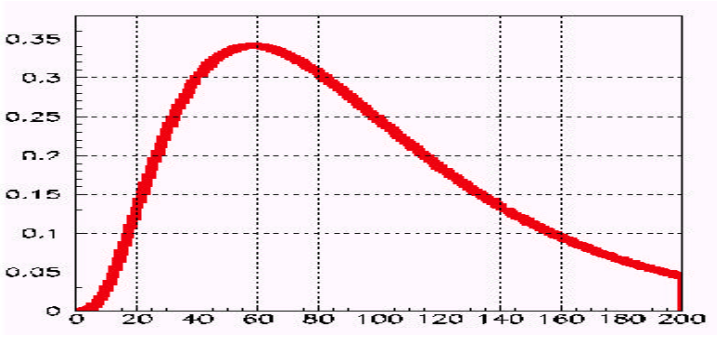
- HLT workshop at CERN 12th July, Friday
  - Presentation on Status & Plans by SK, yesterday
    - http://home.fnal.gov/~kunori/cms/talks/000606-cern/hlt-for-jetsmet.pdf
  - Goal: ~10 reduction on L1 output using only calo data.
- Level 1 TDR- this year (Any more change request?)
- Jets/MET/tau performance (Offline -> L1/L2)
  - correction for non-linearity / pile-up energy subtraction
  - fake jets at low Et due to pile-up
  - tracker for tau and b-tagging

New(2)

Simulation of the front end electronics

- short (QIE) vs. long (ECAL FE)
  - simple (but well controled) simulation
  - full CMSIM simulation + ORCA
- Issues for simulation
  - beam crossing id for L1 - efficiency
  - energy resolution - degradation due to pile-up?





Motivation & Goal

(Shown at discussion on L1 change meeting on 21-Mar-00)

Motivation:

- **Today's L1 table for pure Jet/MET trigger is good for mass scale above 300-400GeV. But Higgs study and other physics studies need to cover 100-200 GeV region, too, at 10E34.**

Goal:

- **Lower Jet/MET threshold!**
  - E.g. Jet > 30GeV, MET > 100GeV
- **Strategy:**
  - Combine Jet/MET with other L1 objects.
  - Sharpen the turn-on curve.
  - Avoid problems associated with lower Et jets.

Today's L1 Jet Trigger Table

(Shown at discussion on L1 change meeting on 21-Mar-00

Trigger Type	Trigger E_T Cutoff (GeV)	95% Efficiency Threshold (GeV)	90% Efficiency Threshold (GeV)	Incremental Rate (kHz)
Sum E_T	400			0.3
Missing E_T	80		200	0.9
Electron	27	35	33	5.3
Dielectron	14	22	20	1.3
Single jet	100	155	142	1.0
Dijet	60	106	100	0.7
Trijet	30	70	65	1.3
Quadjet	20	52	49	1.0
Jet + Electron	50 & 14			0.3
Cumulative Rate (kHz)	12.1			

Table 1: E_T cutoffs, 95% and 90% efficiency turn-on thresholds and incremental rate are shown for a variety of triggers at $\mathcal{L} = 10^{34}$ cm^{-2} s^{-1}.

Pure Jets trigger good for mass scale above 300-400GeV

but,

Higgs study (and others) need to cover 100-200GeV region, too.

=> lower jet Et threshold and combine with other objects at L1

A Wish List

(Shown at discussion on L1 change meeting on 21-Mar-00)

Jets:

- **Sliding 12x12 window seamlessly up to eta 5.**
  - **Trigger on forward tagging jet.**
- **Et scale correction for 12x12 jets.**
  - **To fix calorimeter non linearity.**
    - (Et,eta) dependent.
- **Simple test on jet shape.**
  - **To remove fake jet due to pile-up**
    - look for core of jet, e.g. Et(max-tower)>10 GeV
- **Simple test on j-j, j-l correlation.**
  - **Trigger on forward tagging jet.**
    - Eta-correlation, e.g. | Eta2- Eta1 | > 4.0

MET:

- **Ex'=Ex+Σ(Δ(Et(jet))), Ey'=Ex+Σ (Δ(Et(jet)))**
  - **to fix calorimeter non linearity**